1. (Twice Amended) A method to aid in detecting the presence of tumor cells in a patient, comprising the steps of:

determining the presence of a homoplasmic single basepair substitution in a mitochondrial genome of a cell sample of a patient, wherein the substitution is found in a tumor of the patient but not in normal tissue of the patient; and

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identifying the patient as having a tumor if one or more single basepair substitutions are determined in the mitochondrial genome of the cell sample of the patient.

2. (Twice Amended) The method of claim 1 wherein, prior to the step of determining the presence of a single basepair substitution, the substitution has been identified in a tumor.

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29. (Amended) The method of claim 2 wherein the substitution was identified previously in a tumor of the patient.

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31. (Twice Amended) The method of claim 1 further comprising the step of testing a normal tissue of the patient to determine the absence of the substitution in the normal tissue.

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33. (New) The method of claim 1 wherein the substitution is a T to a C mutation.

34. (New) The method of claim 1 wherein the substitution is a G to an A mutation.

35. (New) A method to aid in detecting the presence of tumor cells in a patient, comprising the steps of:

determining the presence of a single basepair mutation in a mitochondrial genome of a cell sample of a patient, wherein the mutation is found in a tumor of the patient but

not in normal tissue of the patient, and wherein the mutation has previously been identified as a somatic mutation in a tumor; and

identifying the patient as having a tumor if one or more single basepair mutations are determined in the mitochondrial genome of the cell sample of the patient.

36. (New) The method of claim 35 wherein the cell sample is from a tissue suspected of harboring a metastasis.

37. (New) The method of claim 35 wherein the cell sample is from blood.

38. (New) The method of claim 35 wherein the cell sample is from urine.

39. (New) The method of claim 35 wherein the cell sample is from sputum.

40. (New) The method of claim 35 wherein the cell sample is from saliva.

41. (New) The method of claim 35 wherein the cell sample is from feces.

42. (New) The method of claim 35 wherein the step of determining comprises amplifying mitochondrial DNA.

43. (New) The method of claim 35 wherein the step of determining comprises sequencing mitochondrial DNA.

44. (New) The method of claim 35 wherein the step of determining comprises hybridization of DNA amplified from the mitochondrial genome of the cell sample to an array of oligonucleotides which comprises matched and mismatched sequences to human mitochondrial genomic DNA.

45. (New) The method of claim 35 wherein the single basepair mutation is a substitution mutation.

46. (New) The method of claim 35 wherein the single basepair mutation is a one basepair insertion.

47. (New) The method of claim 35 wherein the single basepair mutation is a one basepair deletion.

48. (New) The method of claim 35 wherein the single basepair mutation is a transition mutation.

49. (New) The method of claim 35 wherein the single basepair mutation is a homoplasmic mutation.

50. (New) The method of claim 35 wherein the mutation has previously been identified as a somatic mutation in a tumor of the patient.

51. (New) The method of claim 50 wherein the patient has received anti-cancer therapy and the step of determining is performed at least three times to monitor progress of the anti-cancer therapy.

52. (New) The method of claim 35 further comprising the step of testing a normal tissue of the patient to determine the absence of the mutation in the normal tissue.

53. (New) The method of claim 35 wherein the cell sample is from a tumor.

Remarks

The Amendments

Claim 1 has been amended to recite determination of a "homoplasmic single basepair substitution" in place of a "single basepair mutation." The amendment is supported by the specification which discloses that "mutations include single basepair substitutions." (Page 3, lines 6-7.) The amendment is also supported by the specification